

I Claim:

1. A process for treating a by-product generated in an ammonolysis reaction for the production of a silazane or polysilazane product, which comprises the steps of:

5 (i) separating the silazane or polysilazane product from an ammonolysis by-product comprising at least one ammonium halide salt or acid thereof in liquid anhydrous ammonia;

10 (ii) forming a reaction mixture by introducing into said ammonolysis by-product a liquid selected from the group consisting of water, a solution comprising a strong base and an acid, and

15 (iii) reacting said reaction mixture resulting in a solution comprising at least ammonium hydroxide and a metal halide salt and/or ammonium halide salt.

2. The process according to claim 1, wherein the ammonium halide salt or acid thereof of the ammonolysis by-product of step (i) is solubilized and ionized in the liquid anhydrous ammonia.

3. The process according to Claim 2, wherein the ammonolysis by-product is reacted with a sufficient amount of water to convert the anhydrous ammonia to a solution comprising at least ammonium hydroxide.

4. The process according to Claim 3, including the further step of stripping and recovering ammonia from said solution comprising at least ammonium hydroxide.

25 5. The process according to Claim 4, wherein the step of stripping and recovering ammonia from said solution comprising at least ammonium hydroxide results in a material comprising a buffered solution comprising at least an alkali metal halide salt.

6. The process according to Claim 2, wherein the reaction mixture comprising the ammonolysis by-product is reacted with a strong base comprising an aqueous solution of an alkali metal hydroxide, said reaction mixture reacting to convert the ammonium halide salt to a
5 solution comprising at least an alkali metal halide salt and ammonium hydroxide.

7. The process according to Claim 6, wherein the aqueous solution of alkali metal hydroxide is sodium hydroxide or potassium hydroxide.

10 8. The process of Claim 6, including the further step of stripping and recovering ammonia from the reaction mixture comprising said ammonium hydroxide.

15 9. The process according to Claim 2, wherein the reaction mixture comprising the ammonolysis by-product is reacted with a sufficient amount of an aqueous acid to yield a product comprising at least an ammonium salt of the acid and to adjust the pH to a range from about 6 to about 10.

10. The process according to Claim 9, wherein the acid is an organic acid or a mineral acid.

20 11. The process according to Claim 10, wherein said organic acid is a member selected from the group consisting of acetic acid, propanoic acid and oxalic acid.

12. The process according to Claim 10, wherein the mineral acid comprises hydrochloric acid or sulfuric acid.

25 13. The process according to Claim 9, comprising the further step of recovering ammonia from the product of the reaction.

14. The process according to Claim 2, comprising the steps of introducing water into the reaction mixture comprising the ammonolysis by-product, stripping ammonia from the reaction mixture, recovering the ammonia as a vapor and condensing as
5 liquid anhydrous ammonia.

15. The process according to Claim 14, wherein the step of stripping the ammonia from the reaction mixture is performed by heating.

10 16. The process according to Claim 14, wherein the step of stripping the ammonia from the reaction mixture is performed by subjecting said mixture to reduced pressure.

15 17. The process according to Claim 1, wherein the silazane or polysilazane product is one which is prepared by an ammonolysis reaction in liquid anhydrous ammonia by introducing at least one halosilane into said liquid anhydrous ammonia, the amount of liquid anhydrous ammonia being at least twice the stoichiometric amount of silicon-halide bonds on the halosilane, the halosilane reacting with the liquid anhydrous ammonia to form an ammonolysis product which is a silazane or polysilazane and an ammonium halide salt or
20 acid thereof, the ammonium halide salt or acid thereof being solubilized and ionized in the liquid anhydrous ammonia.

25 18. The process according to Claim 17, comprising the further step of separating ammonia from the mixture of water with the solubilized and ionized ammonium halide salt and liquid anhydrous ammonia.

19. The process according to Claim 18, wherein the separation of ammonia from the mixture of water with the solubilized and ionized ammonium halide salt and liquid anhydrous ammonia is performed by

heating.

20. The process according to Claim 18, wherein the separation of ammonia from the mixture of water with the solubilized and ionized ammonium halide salt and liquid anhydrous ammonia is performed by
5 subjecting the mixture to reduced pressure.

21. The process according to Claim 20, wherein the ammonia which is separated from the mixture of water with the solubilized and ionized ammonium halide salt and liquid anhydrous ammonia is removed from the mixture as ammonia gas.

10 22. The process according to Claim 20, comprising the further step of recondensing the removed ammonia gas to liquid anhydrous ammonia.